IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Richard A. Jewell and Julie A. Reimer

Serial No. Examiner: Steve Alvo

Filed: Group Art Unit: 1731

For: Method for Producing Cellulose Fiber Having Improved Biostability and the Resulting Products

Preliminary Amendment in Continuing Application

July 30, 2002
Federal Way, Washington 98063

The Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

This amendment is in response to a final Office Action, mailed May 30, 2002, in the parent to the present application. Applicants wish to express their thanks to Examiner Alvo to the cordial telephone interview granted to the undersigned on July 17, 2002. The very helpful suggestions by the Examiner for resolving the outstanding rejections are sincerely appreciated. Hopefully, new understanding was gained on both sides of the issues.

A rejection of the claims under 35 U.S.C 112, second paragraph, in the claims of the parent application, Serial No. 09/838,947, was discussed during the interview. The present claims have made clear that they are not drawn to wood or lignocellulose fibers but to fiber that has initially been at least partially purified by a chemical treatment. Support for the language used is found at page 4, lines 9-12. Claim language has been clarified to indicate that the fibrous product *contains* the biocidal material rather than having been "treated" with the biocide.

A primary reference cited against the claims of the parent case was U.S. Patent 5,462,589 to Nicholas et al. The Nicholas et al. reference was also discussed during the interview and the substance of the discussion is outlined in the following comments. Nicholas et al. is directed to a *wood* preservative system that combines a synergistic mixture of a copper salt with either tribromophenol or sodium omadine. Applicants would note that Nicholas et al. is pertinent to only of their claims in which the fiber product contains copper. The examples in Nicholas et al. show the fungal resis-

tance to their treating chemicals used singly and in the preferred combination. Tables 3, 4, and 6 are pertinent. Much is left to the reader's imagination in the Examples. There is no indication *what* wood species was treated nor is it possible to accurately estimate the amount of the treatment chemicals as a percentage based on wood. One can assume because of its economic importance and from the location of origin of the inventors that a southern pine species was used. We know that the samples were taken from newly cut boards that were immediately kiln dried (column 10, lines 62-64). Construction lumber is typically dried to a moisture content of about 12%. Presuming that a southern pine is correct, the average density from handbook values for 12% moisture loblolly pine would be about 31.8 lb/ft^3 (pcf) (a specific gravity of 0.51). From Table 3 (at the bottom of column 6) the lowest usage of copper alone was 0.091 pcf. Based on the handbook specific gravity we could estimate that this would be about 0.29% copper by weight, above the upper limit of Applicants' claimed range. Applicants would particularly note that Nicholas et al. found that this usage was not particularly effective as a preservative against the fungal species tested, based on weight loss of the soil block samples. Loblolly pine, in effect, represents a worst case scenario since the only other commercially important species of construction lumber treated with decay preservatives are Douglas-fir and western hemlock. Both of these are woods of lower density. Thus the Table 3 0.091% usage with these woods would give even higher concentrations of copper. The other woods in the list enumerated by Nicholas et al. in column 2, lines 20-24, are not commercially preservative treated with the one exception being oak species. Treated oak is used for pilings and railroad ties but is not used as construction lumber and is not kiln dried before treatment. In the other examples, copper alone at the lowest usages did not appear to give any protection at all. (If loblolly pine was used, copper is estimated at 0.59% by weight in Table 4 and 0.31 % in Table 6, based on the respective sample retention of 0.188 and 0.099 pcf.) Thus, if anything, Nicholas et al. would teach away from using copper in the low amounts claimed by Applicants. It must again be noted that Nicholas et al. are treating *wood*, not cellulose fiber.

Applicants have supplied as an attachment tables from a recent handbook showing wood specific gravities.

Applicants would further comment on a very significant and important difference. Nicholas et al. are treating *wood* and not a chemically defibered cellulose. There are major chemical and physical differences between these substrates. Their behavior and performance would not be expected to be equivalent nor could the perform-

ance of one be reliably predicted from the other. As one example, the surface area exposed to potential pathogens of a given weight of fiber is many times greater than that of the equivalent weight of wood. From this, one skilled in the art might readily predict that a significantly greater amount of biocide might be required for fiber for an equivalent degree of protection.

The other reference discussed during the interview was Canadian Patent 1,134,564 to Holbek. Holbek does teach biostable cellulose fiber in which copper, among other heavy metals, is used as a preservative. However, Applicants again refer to the first full paragraph at the top of page 8 where is stated "The amount of impregnating agent ... is ... *at least* 1 percent by weight, calculated on dry fiber weight, and usually 5 percent by weight and often 7-10 percent by weight" (Applicants' emphasis). This is far above Applicants' usage.

It is important to keep in mind the characteristics desired in Applicant's fiber, in addition to its bioresistance. While the ultimate product use is not limited in Applicants' claims, a major market is expected to be as a reinforcement in cement boards where refining is essential. Refining would most probably be necessary in other uses as well. As is clearly evident from Table 5 in the application, raising the copper content results in a corresponding increase in refining energy and reduction in fiber length. The low usages claimed by Applicants minimize these undesirable properties. Resistance to fiber length degradation is now stated in the product claims in functional language.

Other art cited in the parent case was Huth et al., U.S. Patent 5,049,383 or Schultz et al. 5,730,907. Huth et al., in particular, would appear to have very low pertinence. They note that certain cationic polymer dispersions containing dididecylmethylammonium chloride may be used as *wood* preservatives. However, this use is not exemplified or even further discussed. Instead, the compositions are used as fungicidal additives for emulsion paints and plaster coatings. Schultz et al. again describe *wood* preservatives. One composition uses dimethyldedecylammonium chloride in combination with an antioxidant. Table 1 shows weight loss of wood blocks impregnated with DDAC alone, an antioxidant alone, and the combination of the two. Again, the treatment is used on *wood* and there is no suggestion that it might be useful on cellulose fiber to give the protection and properties desired by the present Applicants. The comments made above in the discussion of Nicholas et al. about the differences between wood and fiber apply equally to Huth et al. or Schultz et al.

Applicants believe the claims to be patentable over any of the art previously cited or made of record and urge a speedy allowance.

Respectfully submitted,

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By

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